HMC632LP5 / 632LP5E

v03.0811

MMIC VCO w/ HALF FREQUENCY OUTPUT & DIVIDE-BY-4, 14.25 - 15.65 GHz

Typical Applications

The HMC632LP5(E) is ideal for:

- Point to Point/Multipoint Radio
- Test Equipment & Industrial Controls
- SATCOM
- Military End-Use

Features

Dual Output: Fo = 14.25 - 15.65 GHz
Fo/2 = 7.125 - 7.825 GHz

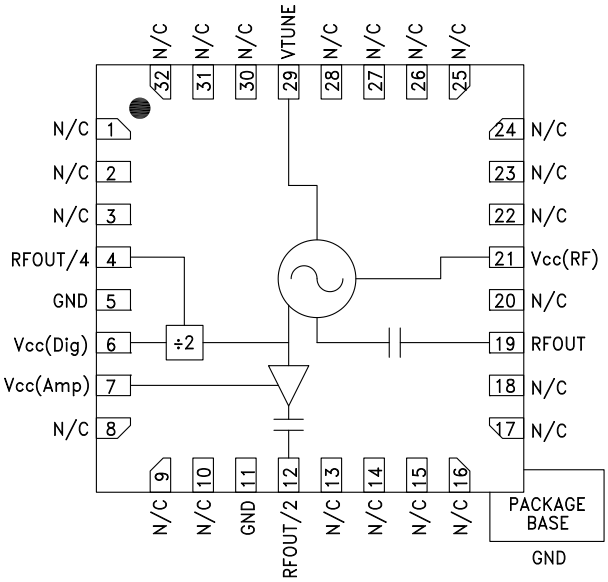
Pout: +9 dBm

Phase Noise: -107 dBc/Hz @100 kHz Typ.

No External Resonator Needed

32 Lead 5x5mm SMT Package: 25mm²

Functional Diagram



General Description

The HMC632LP5(E) is a GaAs InGaP Heterojunction Bipolar Transistor (HBT) MMIC VCO. The HMC632LP5(E) integrates resonators, negative resistance devices, varactor diodes and features half-frequency and divide-by-4 outputs. The VCO's phase noise performance is excellent over temperature, shock, and process due to the oscillator's monolithic structure. Power output is +9 dBm typical from a +5V supply voltage. The prescaler and RF/2 functions can be disabled to conserve current if not required. The voltage controlled oscillator is packaged in a leadless QFN 5x5 mm surface mount package, and requires no external matching components.

Electrical Specifications, T_A = +25° C, Vcc (Dig), Vcc (Amp), Vcc (RF) = +5V

Parameter		Min.	Typ.	Max.	Units
Frequency Range	Fo Fo/2		14.25 - 15.65 7.125 - 7.825		GHz GHz
Power Output	RFOUT RFOUT/2 RFOUT/4	4 7 -8		12 13 -2	dBm dBm dBm
SSB Phase Noise @ 100 kHz Offset, Vtune= +5V @ RFOUT			-107		dBc/Hz
Tune Voltage	Vtune	2		13	V
Supply Current	Icc(Dig) + Icc(Amp) + Icc(RF)	280	350	400	mA
Tune Port Leakage Current (Vtune= 13V)				10	µA
Output Return Loss			2		dB
Harmonics/Subharmonics	1/2 2nd		25 25		dBc dBc
Pulling (into a 2.0:1 VSWR)			10		MHz pp
Pushing @ Vtune= 5V			35		MHz/V
Frequency Drift Rate			1.0		MHz/°C

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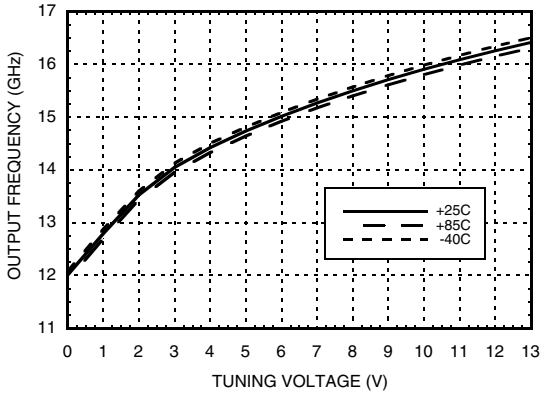
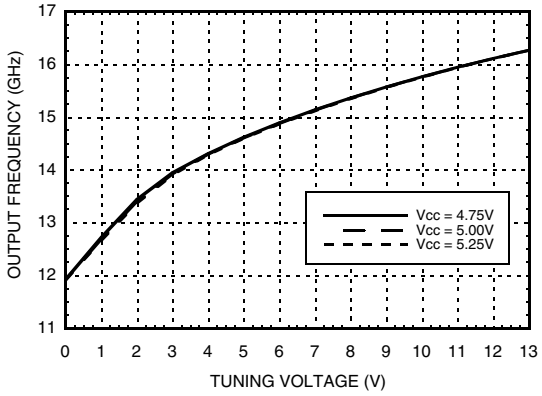
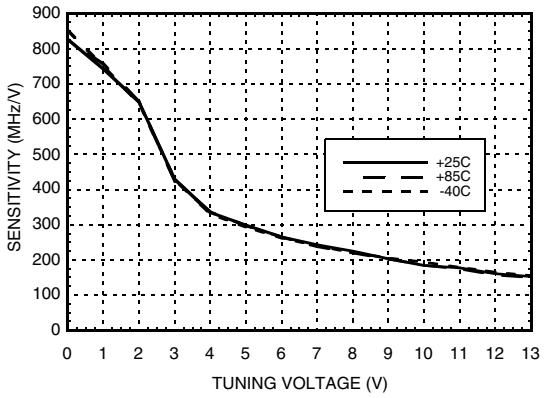
Frequency vs. Tuning Voltage, Vcc = +5V



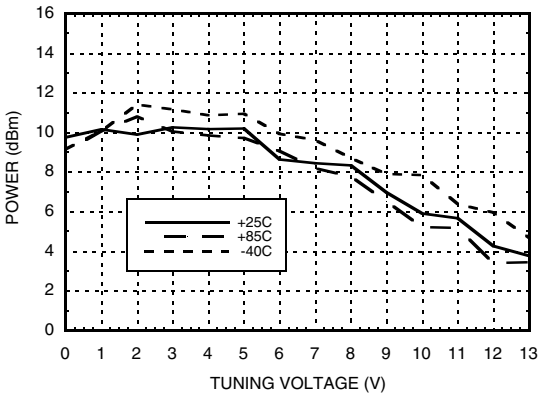
Frequency vs. Tuning Voltage, T= 25°C



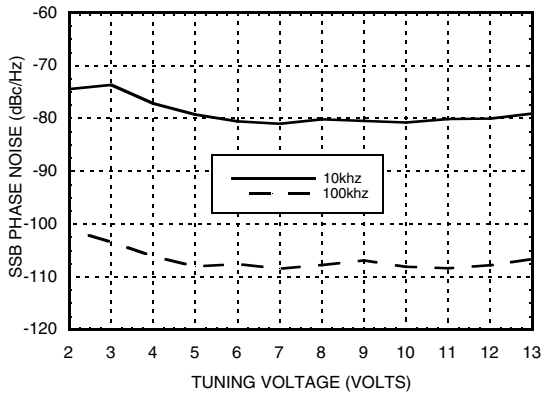
Sensitivity vs. Tuning Voltage, Vcc = +5V



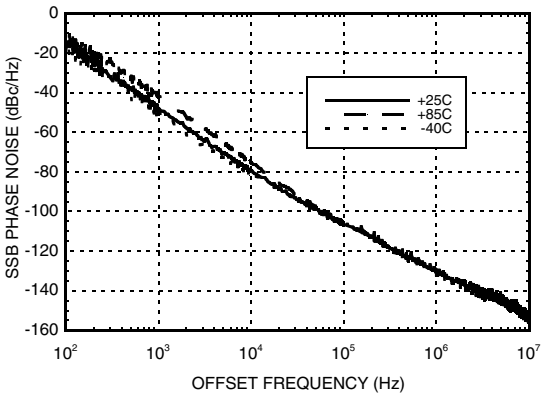
Output Power vs. Tuning Voltage, Vcc = +5V



SSB Phase Noise vs. Tuning Voltage



SSB Phase Noise @ Vtune = +5V



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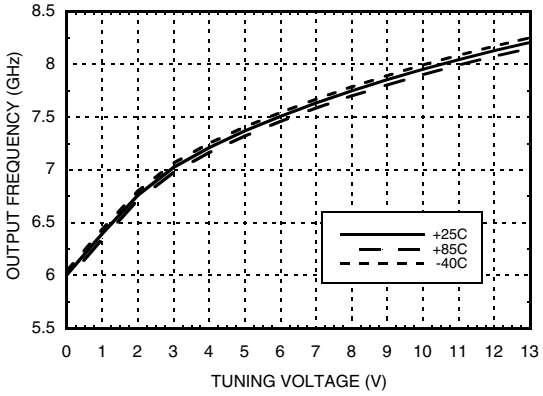
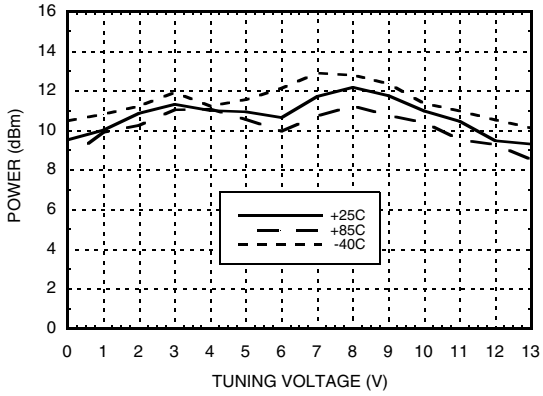
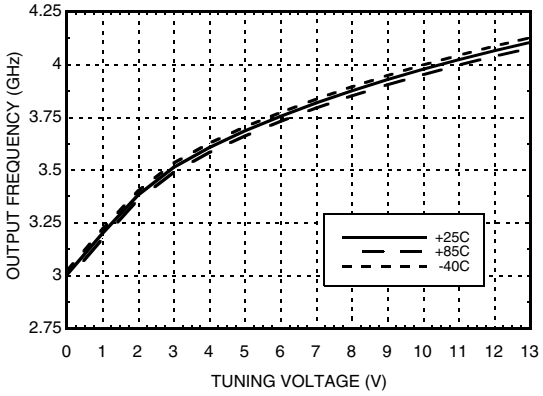
RFOUT/2 Frequency vs. Tuning Voltage, Vcc = +5V



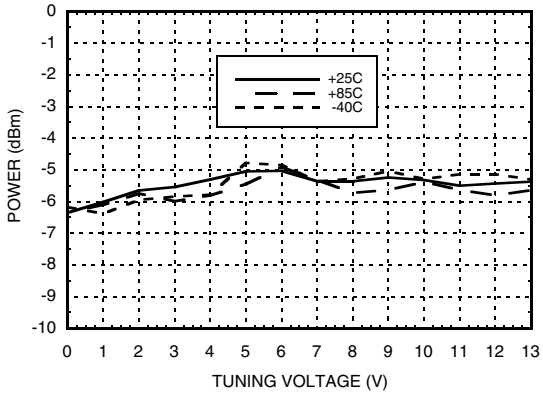
RFOUT/2 Output Power vs. Tuning Voltage, Vcc = +5V



Divide-by-4 Frequency vs. Tuning Voltage, Vcc = +5V



Divide-by-4 Output Power vs. Tuning Voltage, Vcc = +5V



Absolute Maximum Ratings

Vcc(Dig), Vcc(Amp), Vcc(RF)	+5.5 Vdc
Vtune	0 to +15V
Junction Temperature	135 °C
Continuous Pdiss (T=85 °C) (derate 46 mW/C above 85 °C	2.27 W
Thermal Resistance (junction to ground paddle)	22 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

Typical Supply Current vs. Vcc

Vcc (V)	Icc (mA)
4.75	325
5.00	350
5.25	375

Note: VCO will operate over full voltage range shown above.

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

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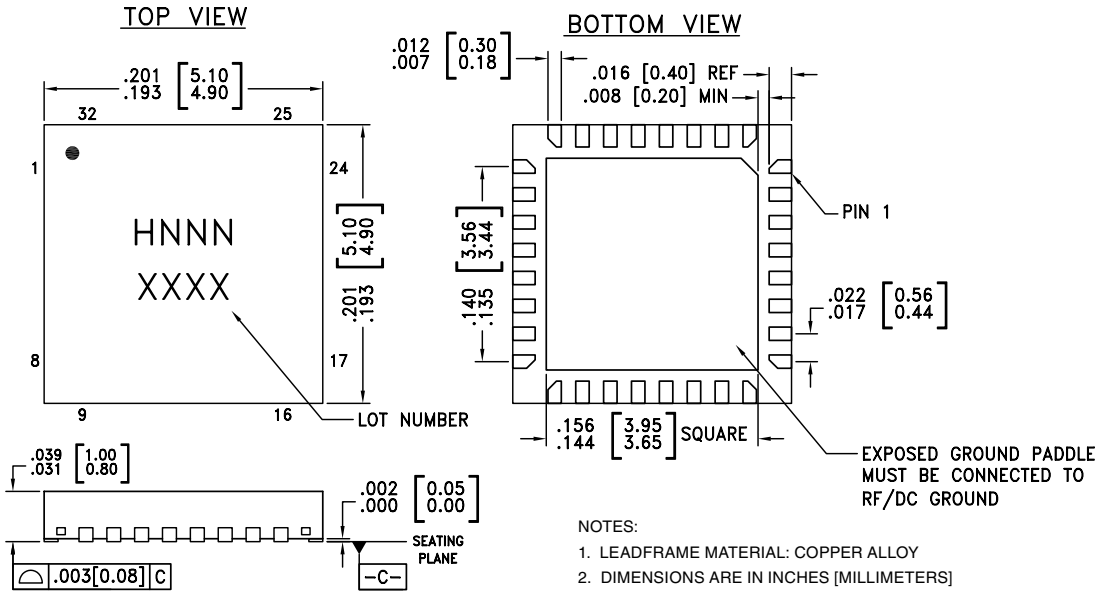
Outline Drawing



NOTES:

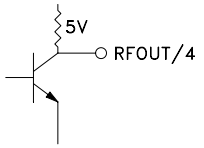
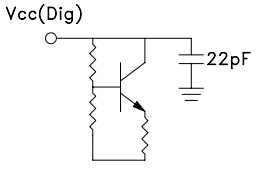
1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
4. PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM. PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM.
5. PACKAGE WARP SHALL NOT EXCEED 0.05mm.
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
7. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED LAND PATTERN.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC632LP5	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL3 [1]	H632 XXXX
HMC632LP5E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3 [2]	H632 XXXX

[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 4-Digit lot number XXXX

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1 - 3, 8 - 10, 13 - 18, 20, 22 - 28, 30 - 32	N/C	No Connection. These pins may be connected to RF/DC ground. Performance will not be affected.	
4	RFOUT/4	Divide-by-4 output. DC block required.	
6	Vcc (Dig)	Supply voltage for prescaler. If prescaler is not required, this pin may be left open to conserve approximately 65 mA of current.	

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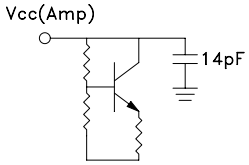
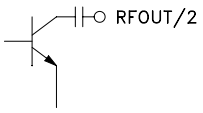
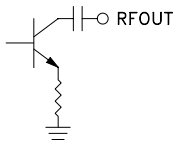
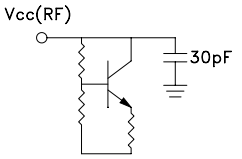
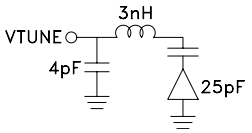
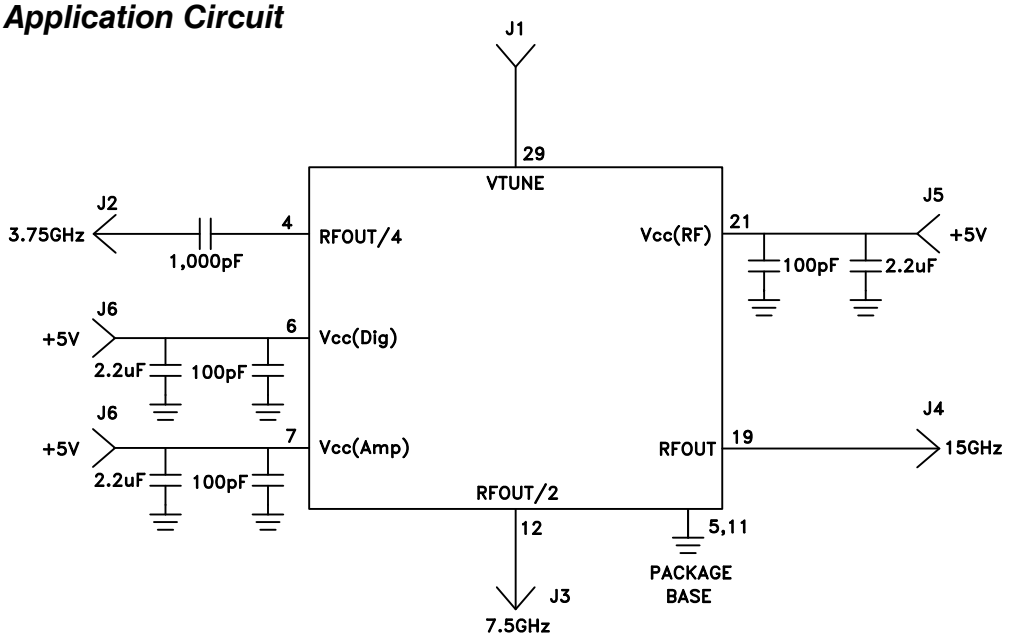
Pin Descriptions

Pin Number	Function	Description	Interface Schematic
7	Vcc (Amp)	Supply voltage, for RFOUT/2 output. If RFOUT/2 is not required, this pin may be left open to conserve approximately 30 mA of current.	
12	RFOUT/2	Half frequency output (AC coupled).	
19	RF OUT	RF output (AC coupled).	
21	Vcc (RF)	Supply Voltage, +5V	
29	VTUNE	Control voltage and modulation input. Modulation bandwidth dependent on drive source impedance. See “Determining the FM Bandwidth of a Wideband Varactor Tuned VCO” application note.	
5, 11, Paddle	GND	Package bottom has an exposed metal paddle that must be connected to RF/DC ground.	

Typical Application Circuit



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